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Research Article

## The Ability To Write Scientific Articles among University Students Views from Five Institutions in Indonesia

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### KEYWORDS

Scientific Articles;  
 Writing Abilities;  
 Learning to Write Scientific Articles;  
 Writing Learning Models

### A B S T R A C T

The low ability to write scientific articles in students must be addressed immediately. This factor is increasingly prominent when the learning model used is not in accordance with the learning outcomes of the course. This research aims to measure the ability to write scientific articles of university students in Indonesia before and after the application of the Genre-Based Writing Model synthesized with Critical Literacy. A quantitative approach was used in this research with a quasi-experimental research method. The data sources of this research were students from four universities in Indonesia with a total of 144 students. The research data were the students' scientific articles. The data collection technique in this research was the test technique. Based on the results of the research, students' abilities before being treated with the Genre-Based Writing model synthesized with Critical Literacy were in the sufficient category, while after being treated with the model students' abilities were in the excellent category. In other words, there was a significant increase in students' ability to write scientific articles between before and after being treated with the Genre-Based Writing model synthesised with Critical Literacy.

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## INTRODUCTION

Scientific writing is recognised as a key skill for students to enhance their academic ability at the higher education level. Almost three decades of research on scientific writing have been conducted in all fields (Sajid & Siddiqui, 2015). In scientific writing, a writer is required to provide reasons that strengthen the ideas presented. All are conveyed by the author with clear language and can be accepted by the academic community (Fatimah, 2018).

In 2015 the PISA test was held again. The Ministry of Education and Culture reported a fairly good increase in literacy in Indonesia. In 2015, out of 72 PISA participating countries, Indonesia was ranked 58th with a score of 397. This gave rise to new optimism for the Indonesian people

to continue to strive to develop competencies, even though these 7 achievements were still below the OECD average (Damayantie, 2015).

Students as prospective scientists are prepared to have various competencies related to science, technology, and art according to the type of study program they are taking. Students are not only required to read scientific writings, but also must be able to write their own scientific works. Therefore, students must be able, skilled, master, develop, and disseminate knowledge by improving the skills of writing scientific articles. Writing skills are also needed by students as part of the requirements for obtaining a bachelor's degree, namely writing a thesis and scientific articles (Sari, Sumarmi, Utomo, & Astina, 2021). Writing learning in higher education is still widely practised based on grammar, which focuses on writing sentences rather

than forming compositions to fulfil the purpose of reader diversity (Mulatsih, 2017).

In the 1970s and 1980s, the approach used in teaching writing was a process approach, which emphasized individual problem solving. through a planning-writing-reviewing framework ( Kuiper, Kuiper, Smit, Wachter, De, & Elen, 2017)suggested that in the late 1980s and 1990s, the approach in learning switched to a genre approach. This approach emphasizes learning to write collaboratively within a contextual framework, highlighting the meaning and type of text. The genre approach emerged in Australia in the 1980s an ideological view that empowers all students with linguistic resources for social success.

Genre-based academic writing instruction has been widely adopted as an instructional strategy to improve student learning success in academic writing courses or workshops (Mulyono, Ningsih, Fausia, & Setiawan, 2023). The implementation of the genre-based approach in Indonesia has started since its implementation Competency Based Curriculum (KBK) or Curriculum 2004 (KBK). In 2006, the Indonesian government implemented the 2006 Curriculum or School-Based Curriculum (KTSP), which was still proposed by the Genre-Based Approach. as a teaching approach. Furthermore, in 2013 the government changed the curriculum to the 2013 curriculum (K-13) which recommends its use several alternative approaches in teaching language skills. One of the recommended alternative approaches is Genre-Based Approach (Zebua & Rozimela, 2020).

The assumption of the Genre-Based Writing model is that learning is shaped by social groups, desired actions, and settings, all of which lead to genre development. Therefore, the writing process involves identifying, and responding to the unique demands of a particular situation. This model leads to understanding text as a genre, then the genre is analyzed and in the writing process it involves the author's insight (Tardy, 2019) .

The term genre is familiar, usually used to describe the categories of books, music, films and art. The basic idea of genre as a category is useful for academic writing, just as it is for forms of art, film, or music. Genres are helpful in sorting through different types of writing, understanding their differences, and identifying common features or conventions of a particular genre. For students, genre offers a lens or frame to understand what makes writing effective in different situations and contexts (Tardy, 2019) . Anshori and Damaianti (2022) defines genre as a type of text that has something in common with other texts because everyone who creates texts will follow rules – recipes, traditions, strong habits, and examples (role models) as a guide.Tardy (2019) suggests that the so-called academic genre is a form of social practice that is not generally used

in everyday life. In addition, academic genres are often very complex and may not only rely on knowledge of social practice (teachers, researchers, scholars),. and professors) but also on very specific subject matter knowledge. Genre-based learning is basically a learning approach that provides tools for students to understand text as a genre, to analyze those genres, and to use these insights in their writing (Tardy, 2019). According to Pratama, Al-Ghazali, and Sadikin (2020), learning Genre Based Writing is a place to train and develop students' abilities, sensitivity, and awareness in writing towards various genres.

Tardy (2019) suggests that the principles of the Genre-Based Writing model consist of 5, namely: 1) writing is flexible, driven by goals or actions, and related to social and community contexts; 2) students must read, write, and explore relevant genres; 3) upgrade awareness make student sensitive to convention genres And effect the rhetoric; 4) genre exploration which is encouraged by students deepening their rhetorical awareness (or genre awareness); and 5) scaffolding instructions help make the complexity of the genre easy to learn.

Tardy (2019) suggests six steps for implementing Genre-Based Writing. The six steps are: 1) selecting genres of focus; 2) sequencing and scaffolding tasks; 3) selecting sample texts; 4) keeping it student centered; 5) contextualizing tasks; and 6) producing genres.

As our world becomes noticeably more connected and narrower in the digital age, critical literacy approaches are essential to keep pace with technological developments and innovations that create complexity in processing and create meaning in digital spaces (Mills, Unsworth, & Scholes, 2022).

In general, the term 'critical' is defined as a generally accepted attitude of skepticism, whereas in terms of 'critical' education discourse is defined three concepts namely, critical pedagogic, critical thinking, and critical literacy. (Hendriani, Nuryani, & Ibrahim, 2018). The term critical literacy is closely associated with the Frankfurt School from the 1920s and their focus on Critical Theory. The most prominent figure associated with the roots of critical literacy is Paulo Freire (Vasquez, 2017).

Critical literacy is the ability to read actively and reflectively, which aims to gain an understanding of power, inequality and injustice. In addition, it is argued for 'critical literacy', namely a combination of critical thinking skills and attention to the content of social justice, language, politics, and power in the text (Hendriani et al., 2018).

In the world of education, critical literacy aims to help students focus on creating critical readers, speakers and writers in deconstructing texts and interpreting them. In this context literacy is defined ideologically (Hendriani et

al., 2018). Critical literacy direct students to reading reflectively and encouraging them to reveal the implicit meaning behind the text (Sultan, 2018 , p. 16).

Kern in Sultan (2018) states the principles of critical literacy, which involve: 1) interpretation; activity speak on in fact is interpretation to reality; 2) collaboration; process production And reception reading is a collaborative act of writer and reader; 3) convention; Language reflect habits from aspect culture Language Which studied; 4) knowledge culture; Language is part of attitudes, beliefs, habits, and the values of the user community; 5) ability finish problem; Study Language is process think to solve the problem; and 6) reflection; evaluate use language based on context.

Various definitions of writing have been put forward by para experts from various points of view. Basically writing is an activity of expressing ideas, ideas, and feelings through the medium of written language. Abidin (2021) argues that writing is basically a process of expressing ideas and ideas in written language. In line with Semi's opinion, Musaba and Siddik (2018) revealed that writing means giving birth or expressing thoughts and or feelings through symbols (writing) which of course are all symbols which are the result of an agreement between language users who understand each other.

The notion of writing is synonymous with the scientific creative process. This is as stated by Dalman (2016) that writing is a creative process of expressing ideas in the form of written language that aims to inform, convince, or entertain. The result of the creative process is called writing or essay. The term writing is attached to a creative process of a scientific type, while the term composing is often attached to a creative process of a non-scientific type. Dalman (2016) means that writing is a process of conveying thoughts, wishes, feelings in the form of meaningful symbols/signs/writing. The author with his writing seeks to provide or convey all forms of information to the reader with the hope that the reader will accept everything he expresses. In this case the purpose of writing is to influence the reader (Musaba & Siddik, 2018).

Dalman (2016) defines an article as a form of scientific work written based on research results and ideas or literature review. The ability to write scientifically is essentially an ability to solve and analyze a problem or issue based on the framework of the scientific writing method. According to Rahmiati (2013) a scientific article is a written report of the results of a scientific activity.

Research on the development of the Genre-Based Writing model Synthesized with Literacy in learning to write scientific articles in tertiary institutions has never been done. However, there are several studies that are related to this research as well as the researchers used as a reference.

Research on the Genre-Based Writing Model has been previously conducted by Pratama, et al. (2020) in their research entitled " Application of Genre-Based Writing Models to Improve the Ability of Writing Personal Letters." The result of this study is that the process of learning to write personal letters using a genre-based model consisting of analyzing letter types, writing letters, revising and publishing has increased.

Many previous studies that are relevant to learning to write using a genre-based approach have been carried out. In this regard, only a few studies will be presented, including those conducted by Gintings, 2020); Haryanti & Farnia Sari, 2019); Phichiensathien, 2016); Pujianto, Emilia, & Sudarsono, 2014).). The results of these studies indicate that a genre-based approach can improve writing skills.

In his research, Gintings (2020) states that a genre-based approach can be used for learning to write. The results of his research show: 1) a genre-based approach according to students' needs; 2) this approach can increase students' self-confidence and creativity by allocating independent writing sessions; 3) improve students' critical thinking skills in writing English. Similar to Gintings' research, the results of Haryanti & Sari's ( 2019) research also show that a genre-based approach can improve students' ability to write narrative texts. The difference is that the research was conducted in high school. Other research was conducted by (Phichiensathien, 2018) using three streams of theory, namely New Rhetoric (NR), Systemic-Functional Linguistics (SFL), and English for Specific Purpose (ESP). Genre-based learning in learning academic writing in the context of a second language can contribute to students' writing development. Research Pujianto, et al. ( 2014) demonstrated that a genre-based approach helps student develop writing skills. However, it is known that low achieving students require longer modeling and the teacher-student conference stage.

Based on the explanation above, research on the application of the genre-based writing model is synthesized with critical literacy in learning to write scientific articles in tertiary institutions. important to do. In accordance with the problems above, the main goal to be achieved in this study is to measure the ability to write scientific articles in tertiary institutions..

## METHOD

The approach used in this research was a quantitative approach with quasi-experimental research methods. The quasi-experimental design used is the one shot pretest-posttest design.

The data sources in this research were students from four universities in West Java, namely: Universitas Pendidikan

Indonesia, Universitas Padjadjaran, Institut Pendidikan Indonesia, and Institut Keguruan dan Ilmu Pendidikan Siliwangi. The number of students involved was 144 students. The data collection technique used was a test. According to Widoyoko(2013) a performance test is one of the tools used to make measurements in collecting information on an object.

The data collection techniques used in this research was performance test techniques. Test technique was used to measure students' skills in writing scientific articles after applying the Genre-Based Writing Model Synthesized with Critical Literacy.

The steps of data collection were: 1) initial test to compose scientific articles, 2) given treatment with the Genre-Based Writing Synthesized with Critical Literacy model, 3) final test to compose scientific articles.

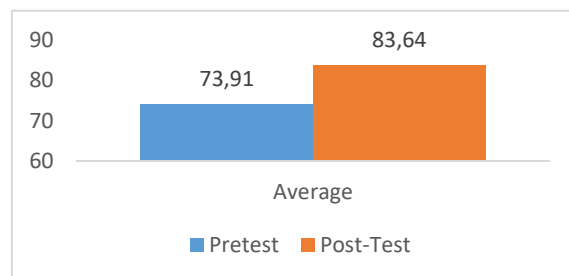
The data analysis technique used was descriptive data analysis technique. Descriptive analysis technique was performed using descriptive statistics. Descriptive statistics were statistics that are used to analyze data by describing or describing the data that has been collected as it was without intending to make general conclusions or generalizations. Analysis of the research data was carried out to determine the validity and effectiveness of the learning tools that had been made. The research data analysis technique is described as follows.

Analysis of student learning outcomes can be seen from the cognitive domain learning outcomes. The success or failure of students' scientific article writing skills can be seen from the results of achieving a predetermined scale value. Data were processed using the SPSS for windows v.26 program.

## RESULTS AND DISCUSSION

This research was conducted on 144 students at four universities. The assessment rubric used to assess student scientific articles is a scientific article writing assessment rubric modified from the opinion of Siregar and Harahap (2019). Based on research results, of the 144 students who took part in this research activity, in the pre-test activities the highest score was 87.50 with very good criteria, the lowest score was 65.50 with sufficient criteria, and the overall average was 73.91 with sufficient criteria. In the initial test activities, it was found that four students had very good abilities, 66 students had good criteria, 71 students had sufficient criteria, and 3 students had less criteria. After the learning treatment was carried out with the development of the GBWDLK model, overall student abilities increased from moderate to good with an average score of 83.64. In this final activity, the highest score was 96 with very good criteria and the lowest score was 65.17 with sufficient criteria. In plain view there was an increase

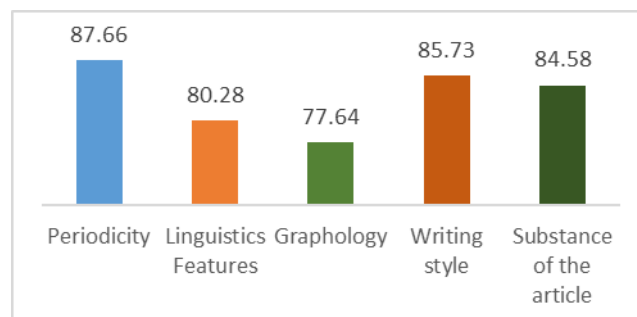
in ability from the initial test, namely there were 81 students with very good ability criteria, 31 students with good ability criteria, and the remaining 32 students with sufficient ability criteria. In this final test activity, there were no students with less ability.



**Figure 1.** The Average Value of Students' Ability To Write Articles

Each genre has a number of features that distinguish it from other genres: each has a specific purpose, structure, certain linguistic features, and is used by a cultural community. In this study, the aspects assessed in the writing of student scientific articles consisted of 1) periodicity, 2) linguistic features, 3) graphology, 4) writing style, and 5) article substance. The periodicity aspect includes the main theme and subordinate themes; themes and rhymes; as well as lexical cohesion, references, and conjunctions. Aspects of linguistic features include language structure and diction. The graphological aspect is the accuracy and precision in the use of spelling and punctuation. Aspects of writing style include: completeness and effectiveness of titles; inclusion of the author's name; college name; abstract and keywords; article writing systematics; bibliography and citation system; compilation of bibliography; use of terms and language. Aspects of the substance of the article include elements of the introduction; method; results and Discussion; and conclusion.

The distribution of student ability scores from each of these aspects can be observed in the following diagram.



**Figure 2.** Student Writing Ability from Each Aspect

From the diagram above, it is known that the average student ability in the periodicity aspect is 87.66 with very good criteria, the ability in the aspect of linguistic features is 80.28 with good criteria, the ability in the aspect of

graphology is 77.64 with good criteria, the ability in the aspect of writing style is 85.73 with very good criteria, and ability in the substance aspect of article 84.58 with very good criteria.

To find out the effectiveness of the GBWDLK model on the ability to write student articles in the limited test, a statistical test was carried out. The statistical test that was carried out was a two-difference test with an average of the initial test and the final test. Before carrying out the two-mean difference test, the data normality test was carried out first.

This data normality test was carried out to find out whether the data in this study were normally distributed or not. This data normality test is needed to determine the statistical test that will be carried out next. There are two kinds of normality tests performed, namely the Kolmogorov-Smirnov and Shapiro-Wilk tests. The Kolmogorov-Smirnov test was carried out when there were more than 50 samples in the study, while the Shapiro-Wilk test was carried out if there were less than 50 samples. The number of samples in this study was 144, so the Kolmogorov-Smirnov test was used. In this data normality test activity the software application SPSS for windows version 26 and MS Excel was used.

After carrying out the normality test of the initial test data and the final test, the results can be observed in the following table.

**Table 1.** Data Normality Test

	Kolmogorov-Smirnov <sup>a</sup>		
	Statistics	df	Sig.
Initial Test of Ability to Write Scientific Articles	.078	144	.033
Final Test of Ability to Write Scientific Articles	.160	144	.000

Based on the results of the normality test above, it is known that the significance value (Sig.) in the Kolmogorov-Smirnov test for the initial test data is 0.033 <0.05, meaning that the data is not normally distributed, as well as the final test data is 0.000 <0.05, meaning that the data is not normal. It can be concluded that the research data is not normally distributed. So, for the next non-parametric statistical test.

**Table 2.** Wilcoxon Statistical Test

	Scientific Article Writing Ability Final Test - Initial Scientific Article Writing Ability Test
Z	-10.141b -
asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test  
b. Based on negative ranks.

Basis for decision making of Wilcoxon test:

1. If the Asymp.Sig value < 0.05, then the hypothesis is accepted.
2. If the Asymp.Sig value > 0.05, then the hypothesis is rejected.

Based on the statistical test results, it is known that the Asymp.Sig (2-tailed) value is 0.000. Because 0.000 <0.05, it can be concluded that the hypothesis is accepted. This means that there is a difference between the ability to write scientific articles using the GBWDLK model for initial and final test scores, so it can be concluded that there is an effect of developing the GBWDLK model on learning to write scientific articles in the broad test activity

## CONCLUSION

From the results of this study, it is known that the GBWDLK model can significantly improve students' ability to write scientific articles in higher education. The obstacles faced by researchers are that the large number of data sources in this study resulted in the length of research time because the assessment process of student articles takes a relatively long time. Based on the results of the study, it is recommended that the GBWDLK model can be applied to hone students' abilities in writing scientific article genres other than journal articles.

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